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V.S.

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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09/416,860	10/13/99	MONTGOMERY	D 16650004US03
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IM62/0127

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EXAMINER

SMITH HICKS, E

ART UNIT

PAPER NUMBER

1741

DATE MAILED:

01/27/00

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.
09/416,860

Applicant(s)
Donald D. Montgomery

Examiner
Erica Smith-Hicks

Group Art Unit
1741



☒ Responsive to communication(s) filed on Oct 13, 1999

☐ This action is **FINAL**.

☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire three month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

Disposition of Claims

☒ Claim(s) 1-51 is/are pending in the application.

Of the above, claim(s) _____ is/are withdrawn from consideration.

☐ Claim(s) _____ is/are allowed.

☒ Claim(s) 1-51 is/are rejected.

☐ Claim(s) _____ is/are objected to.

☐ Claims _____ are subject to restriction or election requirement.

Application Papers

☒ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.

☐ The drawing(s) filed on _____ is/are objected to by the Examiner.

☐ The proposed drawing correction, filed on _____ is ☐ approved ☐ disapproved.

☐ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

☐ All ☐ Some* ☐ None of the CERTIFIED copies of the priority documents have been
☐ received.

☐ received in Application No. (Series Code/Serial Number) _____.

☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

*Certified copies not received: _____

☒ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

☒ Notice of References Cited, PTO-892

☐ Information Disclosure Statement(s), PTO-1449, Paper No(s). _____

☐ Interview Summary, PTO-413

☒ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Notice of Informal Patent Application, PTO-152

--- SEE OFFICE ACTION ON THE FOLLOWING PAGES ---

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DETAILED ACTION

Specification

1. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Objections

2. Claim 10 is objected to under 37 CFR 1.75 as being a duplicate of claim 9.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371© of this title before the invention thereof by the applicant for patent.

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4. Claims 1-34, 36-44 and 47-51 are rejected under 35 U.S.C. 102(e) as being anticipated by Heller et al. US 5,929,208.

Claims 1 and 47 are rejected because Heller et al. disclose a method for electrochemical placement of a material at a specific location on a substrate, which comprises the steps of : providing a substrate having at its surface at least one electrode that is proximate at least one molecule bearing at least on protected chemical functional group (col. 17, lines 7-11); applying a potential to said electrode sufficient to generate electrochemical reagents capable of deprotecting at least one of the protected functional groups of said molecule and bonding the deprotected chemical at col. 20 lines 25-48. The substrate may be of porous materials such as glass, silicon dioxide, plastic or ceramic materials (col. 10, lines 5-8) and more specifically CPG (col. 17, lines 7-9) consistent with those materials Applicant indicates on pages 27, lines 18-28; 28 line 18; 29, line 7 and 30, line 14 of the Specification.

Claims 2, 18, 43 and 48 are rejected because Heller et al. disclose the placing of a buffer solution in contact with the electrode at the surface of the substrate to prevent electrochemically generated reagents from leaving the locality of the electrode (col. 22, lines 25-37).

Claims 3, 19 and 49 are rejected because Heller et al. disclose the use of a phosphate buffer at col. 22, line 41 of the reference.

Claims 4, 20 and 50 are rejected as the prior art discloses that the buffering solution is present in a concentration of at least 0.01 mM at col. 22, line 40.

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Claims 5, 21 and 51 are also rejected as the prior art discloses that the buffering solution is present in a concentration range of 0.1 to 100 mM at col. 22, line 40.

Claim 6 is rejected as Heller discloses protected monomers or preformed molecules having protected chemical functional groups at non-bonding sites in col. 15, lines 48-58.

Claims 7 and 22 are rejected because the prior art reference further discloses amino acid as the monomer in col.21, line 30. (also see col. 6, lines 24-41)

Claims 8 and 37 are rejected as Heller et al. employ pre-formed molecules selected from the group consisting of proteins, nucleic acids, polysaccharides and porphyrins (col.17, lines 1-7). (also see col. 6, lines 24-41)

Claims 9 (duplicate claim 10) and 23 are rejected because the reference discloses the use of linker molecules or monomers in col. 21, lines 10-16.

Claims 11 and 24 are rejected as the molecule of Heller et al. is directly attached to the surface of said substrate, via a linker molecule or attached to a layer of material overlaying said substrate in col. 14, lines 56-67.

Claims 12 and 27 are rejected because Heller et al. teach the protection of the chemical functional groups with an acid or base labile protecting group at col.

Claims 13, 14, 29-31 and 40 are rejected as Heller et al. teach the use of an array of electrodes in col. 4, lines 44-54. While Heller et al. may not expressly recite the specific number of electrodes that are claimed by Applicant, the reference discloses the use of an array to allow for combinatorial synthesis and hybridization analysis in the 1000 to 100,000 copy range (col. 19,

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lines 38-40). Moreover, under the reasoning of *In re Harza*, 274 F.2d 669, 124 USPQ 378 (CCPA 1960), the duplication of parts has no patentable significance unless a new and unexpected result is produced.

Claim 15 is rejected as the combinatorial synthesis method of Heller et al. discloses sequentially deprotecting other protected chemical functional group of the monomer or pre-formed molecule and bonding another monomer or pre-formed molecule to the deprotected monomer in col. 15, lines 48-58.

Claim 16 is rejected as the method of Heller et al. further includes bonding a second monomer and repeating the selective deprotection of a chemical functional group in col. 20, lines 25-49.

Claims 17 and 42 are rejected as the reference discloses selective deprotection by the application of potential to one or more electrodes sufficient to generate electrochemical reagents at the selected electrodes in col. 15, lines 48-58.

Claim 25 is rejected as Heller et al. disclose the use of CPG as protective overlayers in col. 21, lines 31-35 of the reference.

Claim 26 is rejected as the reference also teaches a linker molecule comprising a group cleavable by an electrochemically generated reagent, which cleavable group enables removal from said substrate of one or more bonded molecules in col. 15, lines 48-52 and col. 16, lines 5-16.

Claim 28 is rejected as the substrate used in the prior art may be a semiconductor, plastic, glass or ceramic substrate in col. 10 lines 5-8.

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Claim 32 is rejected as the microcapillary electrode tubes of Heller et al. have diameters in the range of 1-100 μ (col. 22, lines 28-30).

Claim 33 is rejected as Heller et al. teach the use of platinum electrodes (col. 14, lines 34-36).

Claim 34 is rejected as the electrodes in the Heller et al. method may be pre-exposed to hydrogen containing medium in col. 27, lines 5-10.

Claims 36 and 38 are rejected as the Heller et al. method teaches additional bonding steps wherein pre-formed molecules are bonded to deprotected chemical functional groups, said pre-formed molecule bearing at least one protected chemical functional group in claims 6 and 8 of the reference.

Claim 39 is rejected as the electrode pads of Heller et al. are packaged with a switch box for selective activation (col. 25, lines 1-3).

Claim 44 is rejected as Heller et al. teach the method wherein said pre-formed molecule is nucleic acid in col. 16, lines 50-55.

Claim 41 is rejected for the same reason that claim 16 is rejected as Heller et al. teach combinatorial synthesis methods for polymers and oligonucleotides, of which said method further includes bonding a second monomer and repeating the selective deprotection of a chemical functional group in col. 20, lines 25-49. (see also col. 17, lines 3-5 for specific recitation of oligonucleotides).

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Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

7. Claim 35 is rejected under 35 U.S.C. 103(a) as being unpatentable over Heller et al. as applied to claims 1-34, 36-44 and 47-51 above, and further in view of Southern US 5,667,667.

Although Heller et al. as applied, argued and disclosed above teach capping of unbonded deprotected chemical functional groups, they fail to expressly recite acetic anhydride or n-methylimidazole as the capping agents.

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This teaching is provided by Southern in col. 7, lines 6-10 and lines 25-35 where capping agents similar in composition, function and result as those of Applicant's are disclosed.

It would have been obvious to a person of ordinary skill in the art at the time of the invention to have employed the use of highly sensitive dimethoxytrityl groups for capping unbonded deprotected chemical groups taught by Southern in the Heller et al. method because Southern has shown that these materials employed through sequential layering would have facilitated the overall method by allowing for modification of different regions of the surface of the substrate by application of different potential to relevant electrodes without the need for repositioning the electrode array, absent evidence to the contrary.

8. Claims 45 and 46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Heller et al. US 5,929,208 as applied to claims 1-34, 36-44 and 47-51 above and further in view of Savery US 4280885.

Heller et al. are as set forth above and incorporated herein.

While Heller et al. teach the use of an array of electrodes and a system of activation and deactivation of said electrodes for synthesis, they fail to expressly recite the use of a getter structure such as a ring-shaped electrode.

Savery teaches methods and applications for getter electrodes wherein the getter structures are spiral-like and are used to create electric fields that facilitate electrolytic processes effected on semiconductor substrates (col. 4, lines 5-15).

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It would have been obvious to a skilled artisan at the time of the invention to have employed the getter structures taught by Savery in the Heller et al. method for electrochemical synthesis because Savery has shown that the getter structures would have facilitated the overall process by increasing the rate of electrolysis thus providing for a more efficient process, absent evidence to the contrary.

Double Patenting

9. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321© may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

10. Claims 1-51 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-49 of copending Application No. 09/003,075. Although the conflicting claims are not identical, they are not patentably distinct from each other because Applicant's pre-amendment to independent claims 1, 16, 41, 44 and dependent claim 2 does not provide a clear demarcation between the claims of the instant and said

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co-pending. As the claims are read in light of the specification and as the specification provides for porous substrates, the instant claims are found to be within the scope of claims 1-49 of the parent application 09/003,075.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

11. Claims 1-51 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-51 of copending Application No. 09/394,138. Although the conflicting claims are not identical, they are not patentably distinct from each other because Applicant's pre-amendment to independent claims 1, 16, 41, 44 and dependent claim 2 does not provide a clear demarcation between the claims of the instant and said co-pending. As the claims are read in light of the specification and as the specification provides for porous substrates, the instant claims are found to be within the scope of claims 1-51 of co-pending 09/394,138.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

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Conclusion

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Kallury et al. US 5,405,766 disclose a non-electrochemical method for preparing immobilized enzymes through the synthesis of appropriately functionalized phospholipids and binding said chemical functional groups of bioactive substances; Baldeschwieler et al. US 5,824,470 who teach a platinum scanning probe functionalized with an electroactive reagent (col. 11, lines 1-58); Joran US 5,364,851 who teaches a method for producing conformationally restricted biologically active peptides; Meade et al. US 5,952,172 who teach nucleic acid mediated electron transfer and Bednarski et al. US 5,510,481 who disclose a method for fabricating molecular film using functionalized monomers; US 5,679,590 to Mori et al., WO 97/119505 to Smith et al.; WO 96/0791 to Heller et al.; and Applicant's own prior art WO 98/01221, filed July 3, 1997 and issued January 15, 1998.

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13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Erica Smith-Hicks whose telephone number is (703) 305-7645. The examiner can normally be reached on Monday-Thursday from 8:30 a.m. to 6:00 p.m. and on alternate Fridays from 8:30 a.m. to 5:00 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kathryn Gorgos, can be reached on (703) 308-3328. The fax phone number for the organization where this application or proceeding is assigned is (703) 305-7718 and for After Final faxes it is (703) 305-3599.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.


Kathryn Gorgos
Supervisory Patent Examiner
Technology Center 1700

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January 20, 2000